

## **REMARKS**

Favorable reconsideration and allowance of this application are requested.

### **1. Preliminary Remarks and Discussion of Amendments**

By way of the amendment instructions above, claim 1 has been amended so as to include the subject matter of claim 2 and to clarify the feed location of the second product into the cyclohexanone oxime synthesis zone (e.g., as shown in Fig. 1). As such claim 2 has been canceled as redundant.

The embedded preferred ranges expressed in prior claims 10 and 13 have been recast as new claims 20-25 each of which is dependent from the amended version of claim 1.

Thus, claims 1 and 3-25 remain pending herein for which allowance is solicited.

### **2. Information Disclosure Statement Pursuant to Rule 97(c)**

The Examiner's attention is directed to the following commonly owned U.S. patents and pending applications which may be deemed relevant to the subject application: U.S. Patent Nos. 7,005,547, 6,759,556 and 6,844,469 and U.S. Patent Application Serial Nos. 10/496,873 filed on November 17, 2004 (published as U.S. Published Application 2005-0065375) and 10/479,191 filed on July 6, 2004 (published as U.S. Published Application 2005-0038294). Each of these commonly owned patents and application is listed on the accompanying form along with publications cited therein that are not already of record in the subject application.

The Examiner is requested to initial the attached form PTO/SB/08a and to return a copy of the initialed document to the undersigned as an indication that the listed publications have been considered and made of record. The fee required by Rule 97(c) is attached for such purpose.

### 3. Response to 35 USC §103(a) Issues

Prior claims 1-19 attracted a rejection under 35 U.S.C.103(a) as allegedly being unpatentable over Rulkens et al. (EPO 005 291 hereinafter also referred to as "EP '291") in view of Stamicarbon's GB 1,138,750 (hereinafter also referred to as "GB '750"). As will become evident from the following discussion, applicants suggest that the rejection advanced by the Examiner is inappropriate against the pending claims.

In this regard, the following discussions regarding both the EP '291 and (the much earlier) GB '750 publications is present in the subject application as originally filed at page 2, lines 7-26, albeit in different order:

"GB-A-1,138,750 discloses a process, wherein the conversion of cyclohexanone in the cyclohexanone oxime synthesis zone is incomplete, resulting in an organic solution comprising, besides cyclohexanone oxime and organic solvent, cyclohexanone. In said process the organic solution containing the residual cyclohexanone is fed to an after-reaction vessel to convert the residual cyclohexanone into cyclohexanone oxime by reaction with hydroxylammonium at an increased pH. After the conversion of the residual cyclohexanone in the after-reaction vessel, the organic solution is subjected to the distillation to recover the cyclohexanone oxime. This process is disadvantageous, since the after-reaction results in salt formation.

EP-A-5291 also describes a process wherein the conversion of cyclohexanone is incomplete, resulting in an organic solution comprising, cyclohexanone oxime, organic solvent (toluene) and cyclohexanone. In order to obviate the conversion of cyclohexanone in the after-reaction vessel, EP-A-5291 provides a process, wherein the cyclohexanone-containing organic solution is subjected to distillation. In a first step organic solvent is separated

out as a (first) top product. the resulting bottom product is further distilled to obtain cyclohexanone oxime as a bottom product. As a result of this further distillation a (second) top product is obtained comprising cyclohexanone and organic solvent. Accordingly, the process of EP-A-5291 results in a first product comprising organic solvent, a second product comprising cyclohexanone, and a third product comprising cyclohexanone oxime.”

In the process of EP '291, the second product comprising cyclohexanone is not further used or treated. The distillation is carried out extensively, e.g. using a reflux or a three-column system, presumably to separate out as much of the cyclohexanone oxime as possible. Such extensive distillation has the disadvantage that it requires high investment and/or operational costs.

It is respectfully noted that the specification of EP '291 (at its first page) already makes reference to GB '750, and provides an improvement thereon by requiring that the solution of cyclohexanone oxime in toluene from which the oxime is to be recovered by distillation contains ***over 0.5 q of cyclohexanone per 100 q of oxime***.

In addition to the aforementioned quoted parts from the present specification as originally filed, it also can be seen, that

- o GB '750 does not make use of a second (nor further) distillation step; accordingly there is no recycle stream corresponding to stream 10 in the present application;
- o the top product of the only distillation in GB '750 (toluene/water stream 7 in GB '750; stream 5 in the present application) is recycled into (in the terminology of the present application) the bottom level of the cyclohexanone oxime synthesis zone;

- o EP '291 indeed teaches the use of a second (and third) distillation for achieving sufficiently pure cyclohexanone oxime, but there is no recycle stream corresponding to stream 10 in the present application;
- o neither GB '750 nor EP '291 provides any disclosure or teaching as to changes in the composition of stream 9 (in GB '750), respectively stream 4 (in the present application) for discharge of aqueous solution,

The Examiner's argument, that recycling unreacted starting material back into the reactor is "obvious" for one skilled in the art, however, does **not** lead to the conclusion that the mere combining of EP '291 and GB '750 would provide the presently claimed invention. In this regard, it is quite clear from the present application that the subject matter disclosed therein is not just a mere combination of the teachings of EP '291 and GB '750 (where EP '291 even is teaching away from combining with GB '750 because GB '750 provides a completely different method using an after-reaction).

Moreover, combining of EP '291 and GB '750 at best might suggest (please see second bullet above), that recycling (of a stream **not** occurring in either EP '291 or GB '750) would be done into the bottom level of the cyclohexanone oxime synthesis zone. The Examiner's reference to Figure 1 of GB '750 is, moreover, misplaced in the context of assessing patentability of the present invention. Specifically, applicants note that Figure 1 of GB '750 pertains to a (quite disadvantageous) process for production of cyclohexanone oxime at "virtually complete conversion of ketone into oxime" (see GB '750, page 3, lines 22-25), whereas the process of the present invention clearly relates to **incomplete conversion** processes (i.e. having Figure II of GB '750 as relevant state of the art).

One principal difference between the present invention and EP '291 is that in the process according to the present invention a distillate comprising cyclohexanone is fed from the second distillation into the cyclohexanone oxime synthesis zone. In EP '291

however such distillate is not recycled (Example I), or is fed to a third column (Examples II and III). In Examples II and III recycles are applied within the distillation device, resulting in an extensive distillation and nevertheless always loss of cyclohexanone oxime.

In the process according to the present invention only pure cyclohexanone oxime is isolated after a second distillation column whereas all non-isolated material, i.e. the top product of the second distillation column is recycled into the cyclohexanone oxime synthesis zone (which is then especially done at a level downstream of the feeding level for organic solvent). This is now more clearly emphasized in amended claim 1 above (i.e., since it represents a combination of original claims 1 and 2). According to the method of the present invention there is no loss of cyclohexanone oxime, and additionally also the level of organic contaminants in stream 4 is reduced significantly. None of the references GB '750 and/or EP '291 gives any disclosure or teaching as to this latter effect.

Applicants for these reasons sincerely believe that the process of the present invention, as claimed in the amended version of the claims presented above, is not suggested nor mentioned in the prior art. The presently claimed subject matter provides an improved alternative process compared to the prior art and involves an inventive step. As such, withdrawal of the rejection advanced under 35 USC §103(a) based on EP'291 and GB '750 is in order.

In the Official Action, the Examiner finally makes reference to the combination of GB '291 and WO01/94297 (hereinafter WO '297). The Examiner should of course note that WO '297 is the PCT-publication of assignees now U.S. Patent No. USP 6,759,556. The subject matter of WO '297 patent is especially characterized in that the phosphate concentration in the aqueous reaction medium entering the cyclohexanone oxime synthesis zone is higher than 3.0 mol/l.

The Examiner in particular refers to a paragraph from WO '297, reading:

"....An increased cyclohexanone oxime concentration in the organic medium exiting the cyclohexanone oxime synthesis zone has the advantage that separation of the organic solvent from the cyclohexanone oxime, for instance in a distillation process, can be carried out using less energy. ..."

This paragraph, however, clearly specifically addresses the stream exiting the cyclohexanone oxime synthesis zone and does not disclose or teach any part of the presently claimed process, which is related to (recycle) streams entering the cyclohexanone oxime synthesis zone (especially a level downstream of the feeding level for organic solvent).

In order to provide even better distinction from the prior art prior claims 1 and 2 have been combined as the amended version of claim 1 above. The amended version of claim 1 also includes the place of feeding of the second product into the cyclohexanone oxime synthesis zone.

The advantages of the present process as claimed (including the beneficial effects of choosing the proper place of feeding the second product as a recycle into the cyclohexanone oxime synthesis zone) are demonstrated in the examples and comparative examples of the present application to which the Examiner's attention is directed.

NOTE: Example I in fact is to be treated as a Comparative Example, because the recycling in such Example I occurs at the bottom level of the cyclohexanone oxime synthesis zone. This, however, does not fall within the scope of amended claim 1 above. Moreover, Examples II, III, IV, V and VI clearly show improved results as to the total content of anone + oxime in stream 4 (namely, respectively 4300 ppm, 800 ppm,

**OEVERING et al**  
**Serial No. 10/541,196**  
June 14, 2007

180 ppm, 60 ppm and 45 ppm) versus 13000 ppm according to (Comparative) Example I.

#### **4. Conclusions**

Every effort has been made to advance prosecution of this application to allowance. Therefore, in view of the amendments and remarks above, applicants suggest that all claims are in condition for allowance and Official Notice of the same is solicited.

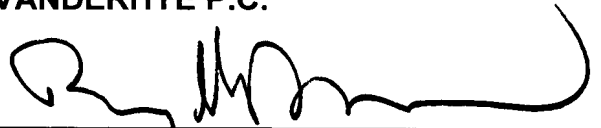
Should any small matters remain outstanding, the Examiner is encouraged to telephone the Applicants' undersigned attorney so that the same may be resolved without the need for an additional written action and reply.

An early and favorable reply on the merits is awaited.

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

By: \_\_\_\_\_



Bryan H. Davidson  
Reg. No. 30,251

BHD:bcf  
901 North Glebe Road, 11<sup>th</sup> Floor  
Arlington, VA 22203-1808  
Telephone: (703) 816-4000  
Facsimile: (703) 816-4100